

## Stories of Hope: Stroke (2014)

Español

### Second Chances



Six months after surviving a stroke, **Sonia Olea** wanted to die. Her right leg was weak, her right arm useless. She had trouble speaking and even small tasks were challenging. Just making a phone call was virtually impossible. One morning, she woke up with her arm pinned in an awkward, painful position. After finally repositioning it, she wanted to call her fiancé, but knew she couldn't get the words out. That's when it hit her.

"I thought, I'm only 32," says Sonia. "How could this be happening to me?"

Nobody really had an answer. A stroke occurs when a blood clot blocks a vessel in the brain and cuts off blood flow. Brain cells begin to die within minutes when they are deprived of oxygen and nutrients. Stroke rates are on the rise for young adults for a variety of reasons but no one could pinpoint specifically what caused hers.

Slowly, Sonia fought back from her depression and realized she could do this. She would find a way to recover. Just one year later, she got a call from Stanford University; asking if she would be willing to participate in a cutting-edge, stem cell-based clinical trial.

Was she ever. The answer, says Sonia, was a no-brainer.

### Rescuing Brain Cells

Led by CIRM grantee Gary Steinberg, M.D., Ph.D., chairman of the Department of Neurosurgery at Stanford School of Medicine, the early phase clinical trial tested the safety of transplanting bone marrow stem cells into the brain. It was a revolutionary approach.

"The old notion was that you couldn't recover from a stroke after around three months," says Steinberg. "At that point, the circuits were completely dead—and you couldn't revive them."

While this was partially true, it was thought that brain cells, or neurons, just outside the stroke damage might be saved. Steinberg and collaborators at the University of Pittsburgh recognized that stem cells taken from bone marrow wouldn't transform into functioning neurons. However, the transplanted cells could release molecules that might rescue neurons that were impaired, but not yet dead.

### Brain Surgery

Sonia had surgery to transplant bone marrow stem cells into her brain in late May 2013. The improvement was almost instantaneous. "When I woke up, my speech was strong, I could lift up my feet and keep them in the air, I even raised my right hand," says Sonia. Though the trial was primarily designed to study the stem cell therapy's safety, researchers were also interested in its effectiveness.

"Sonia was one of our two remarkable patients who got better the day after surgery and continued to improve throughout the year," says Steinberg. 18 patients in total were treated in that study.

Although Sonia's treatment results are still very preliminary, they bode well for a separate CIRM-funded stroke research project also led by Steinberg. In this study, cells grown from embryonic stem cells will be turned into early-stage neuron, or brain, cells and then transplanted into the area of stroke damage. The team has found that transplanting these neural cells into mice or rats after a stroke helps the animals regain strength in their limbs. The team is busy working out the best conditions for growing these neural cells in order to take them into clinical trials.

In the meantime, Sonia continues to improve. "My leg is about 95 percent better and my arm is around 60 percent there," says Sonia. "My speech isn't perfect, but I can talk and that's something I never could have done before the surgery."

The added function has made a huge difference in her quality of life. She can walk, run, drive a car, call a restaurant to make a dinner reservation—simple things she took for granted before having a stroke. But most importantly, she has confidence in the future.

"Everything is good," says Sonia, "and it's only going to get better."

To learn about CIRM-funded stroke research, visit our stroke fact sheet.

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